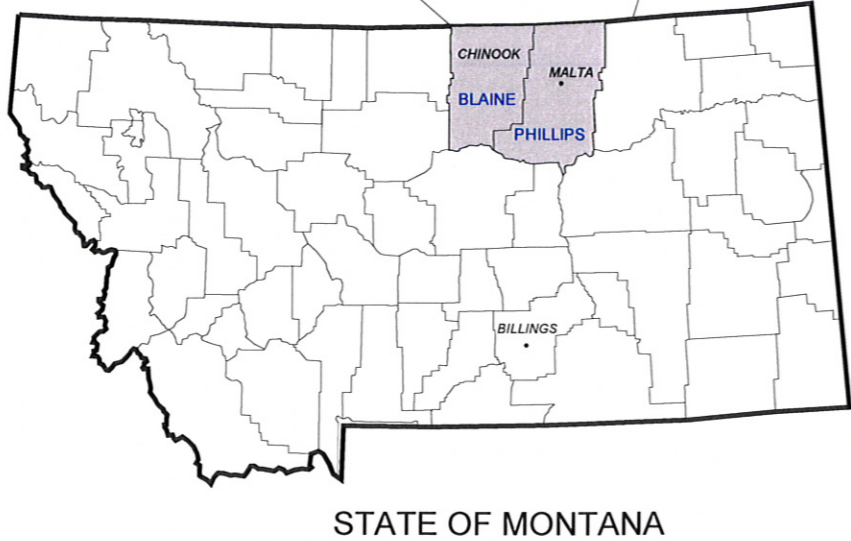
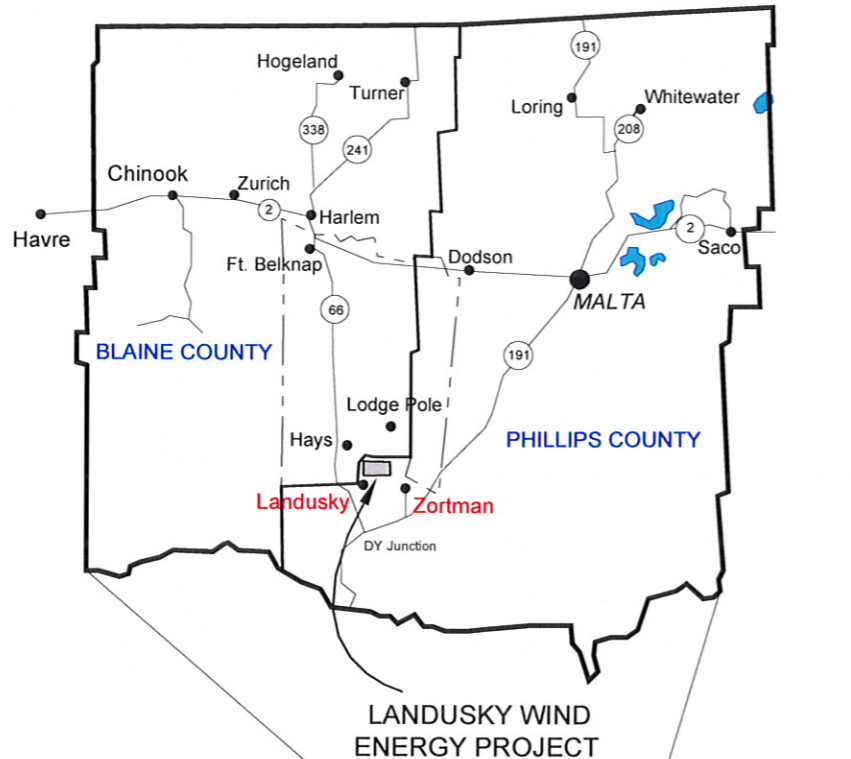


**LANDUSKY WIND ENERGY PROJECT
INVITATION FOR BID**

**SECTION V
PROJECT DRAWINGS**

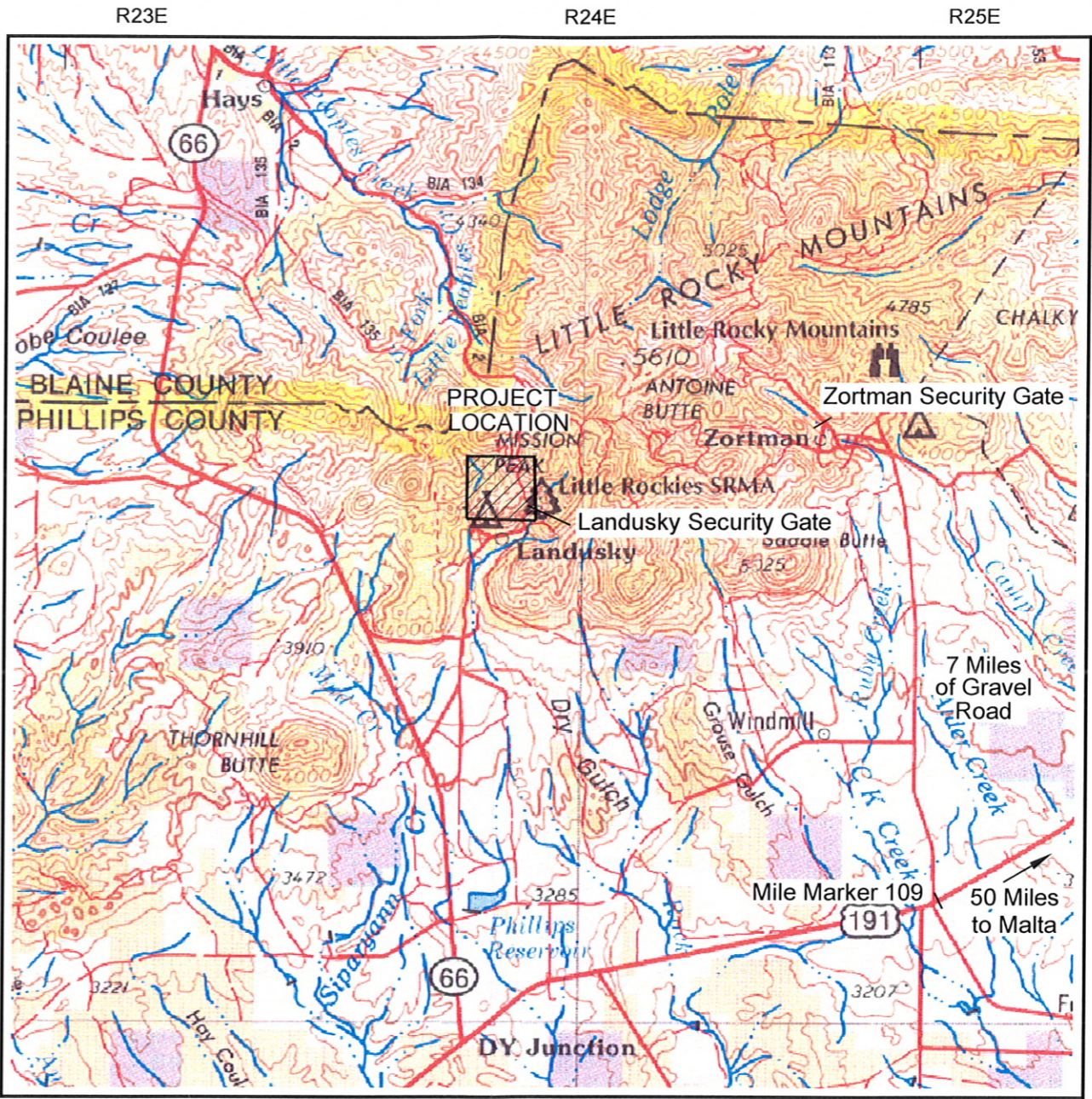
LANDUSKY MINE
LANDUSKY WIND ENERGY PROJECT
SPECTRUM CONTRACT NO. SE-2011-2
Phillips County, Montana



LOCATION MAP SHEET INDEX

SHEET	DESCRIPTION
1	GENERAL LOCATION MAP
2	SITE ACCESS ROADS AND CONSTRUCTION AREA

ELECTRICAL DRAWINGS FOLLOW
SEPARATE INDEX (NUMEROUS SHEETS)



LANDUSKY WIND ENERGY PROJECT AREA

ENGINEER'S CERTIFICATE

I HEREBY CERTIFY THAT THE WORK SHOWN ON THESE PLAN SHEETS WERE PREPARED UNDER MY SUPERVISION. I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MONTANA.

William C. Maehl
William C. Maehl
Montana PE No. 5274PE

REVISIONS			SPECTRUM ENGINEERING	Project on Behalf of: MT Department of Environmental Quality	LANDUSKY WIND ENERGY PROJECT Sec 22 of T25N, R24E - Phillips County, MT	
NO.	DESCRIPTION	DATE			GENERAL LOCATION MAP	
			1413 4th Ave. North Billings, MT 59101 Phone: (406) 259-2412		FILE NAME: 1-TitleWIND.dwg	SHEET NO. 1
			July 2011			

Detailed Design Drawings

Landusky 500 kW WTG Addition



LANDUSKY WIND ENERGY PROJECT

24.94 kV UNDERGROUND COLLECTOR SYSTEM



DRAWING NAME	SHEET NUMBER	REVISION	DRAWING DESCRIPTION
SPE-B-D000	1	A	OVERALL FEEDER ROUTE MAP
SPE-B-D001	1	A	COLLECTOR SYSTEM SCHEMATIC
SPE-B-D002	1	A	TRENCH DETAILS (TREFOIL CONFIGURATION)
SPE-B-D003	1	A	WARNING POST DETAILS
SPE-B-D004-1	1	A	TOWER ENTRANCE DETAILS (OVERVIEW)
SPE-B-D004-2	2	A	TOWER ENTRANCE DETAILS (CROSS SECTION)
SPE-B-D004-3	3	A	TOWER ENTRANCE DETAILS (RADIAL FEED TRANSFORMER #2/0 AWG)
SPE-B-D004-4	4	A	TOWER ENTRANCE DETAILS (CONDUIT)
SPE-B-D005-1	1	A	TOWER GROUNDING OVERVIEW
SPE-B-D005-2	2	A	TRANSFORMER GROUNDING DETAILS
SPE-B-D006	1	A	500 kVA PADMOUNT TRANSFORMER FOUNDATION
SPE-B-D007	1	A	TOWER OBSTRUCTION LIGHTING DETAILS
SPE-B-D008-1	1	A	SWITCHGEAR CABINET DETAILS
SPE-B-D008-2	2	A	SWITCHGEAR CABINET DETAILS (MATERIAL DESCRIPTION)

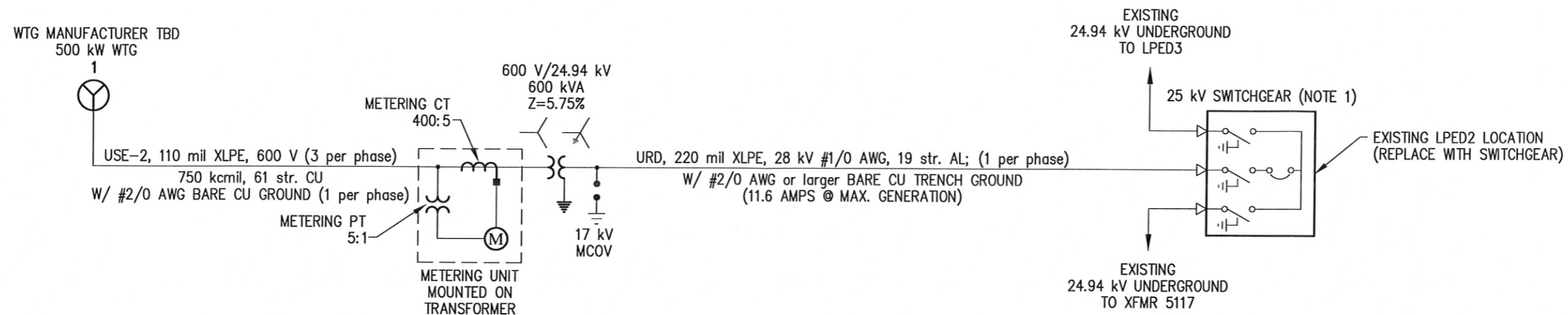
PRELIMINARY
NOT FOR CONSTRUCTION



MANUFACTURER TBD 500 kW Wind Turbine Generator
(500 kW Project)

CONSTRUCTION DRAWINGS
LANDUSKY, MONTANA





PROPOSED COLLECTOR SYSTEM SCHEMATIC

PRELIMINARY
NOT FOR CONSTRUCTION

GENERAL NOTES

- 25 kV SWITCHGEAR INCLUDES MICRO PROCESSOR RELAY FOR PROTECTION OF "GENERATOR" CIRCUIT. MANUFACTURER T.B.D.

FILE LOCATION: L:\SPECTRUM ENG\ZORTMAN-LANDUSKY WIND\CADD\WORKING\COLLECTOR SYSTEM DRAWINGS\SPEB0001.DWG LAST SAVED BY: bnban 7/28/2011 10:00 AM PLOTTED BY: Brigitte N. Schmidt 7/28/2011 10:02 AM Tab:Layout1

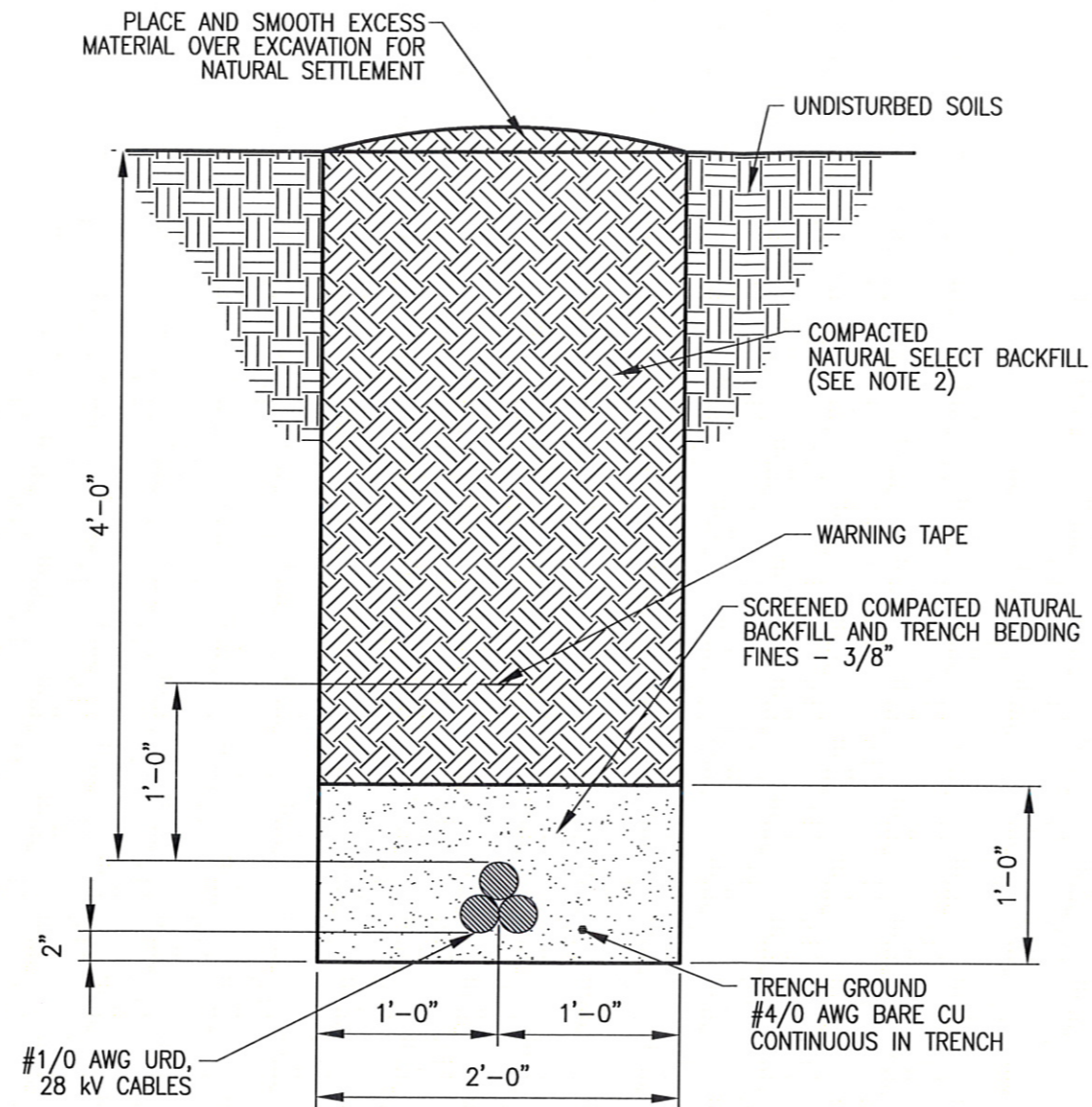


NO	REVISION	DATE	BY	APR
A	ISSUE FOR INTERCONNECTION APPLICATION	9/28/10	SRF	DRM



ENGINEERING RECORD		DATE
DRAWN	SRF	8/26/10
DESIGNED	BDJ	8/26/10
CHECKED	DRM	9/28/10
APPROVED	DRM	9/28/10
DWG SCALE: NONE	PLT SCALE: 1:1	

LANDUSKY WIND ENERGY PROJECT	
24.94 kV UNDERGROUND COLLECTOR SYSTEM	
PROPOSED COLLECTOR SYSTEM SCHEMATIC	
DWG. NAME: SPE-B-D001	REVISION NO: A



TYPICAL TREFOIL CONFIGURATION DETAIL 1

PRELIMINARY
NOT FOR CONSTRUCTION

GENERAL NOTES

1. MAINTAIN 60" MIN. TRAINING RADIUS OF CABLES
2. CONTRACTOR SHALL ACHIEVE MEDIUM DENSITY COMPACTION OF SELECT NATIVE BACKFILLS THROUGH MECHANICAL MEANS. COMPACT IN LIFTS AS NECESSARY TO ACHIEVE COMPLETED TRENCH WITH REASONABLE EXPECTED FUTURE SETTLEMENT.
3. SEE SPE-B-D001 FOR TRENCH LOCATIONS.

FILE LOCATION: L:\SPECTRUM ENG\ZORTMAN-LANDUSKY WIND\CADD\WORKING\COLLECTOR SYSTEM DRAWINGS\SPEBD002.DWG LAST SAVED BY: sfowler 9/30/2010 2:14 PM PLOTTED BY: Brigitte N. Schmidt 7/28/2011 10:03 AM Tab:Layout1

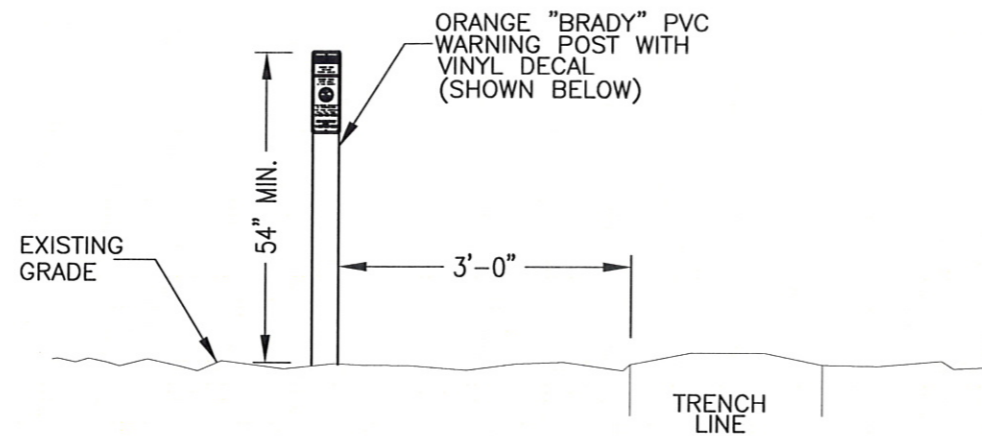


NO.	REVISION	DATE	BY	APR
A	ISSUE FOR INTERCONNECTION APPLICATION	9/28/10	SRF	DRM

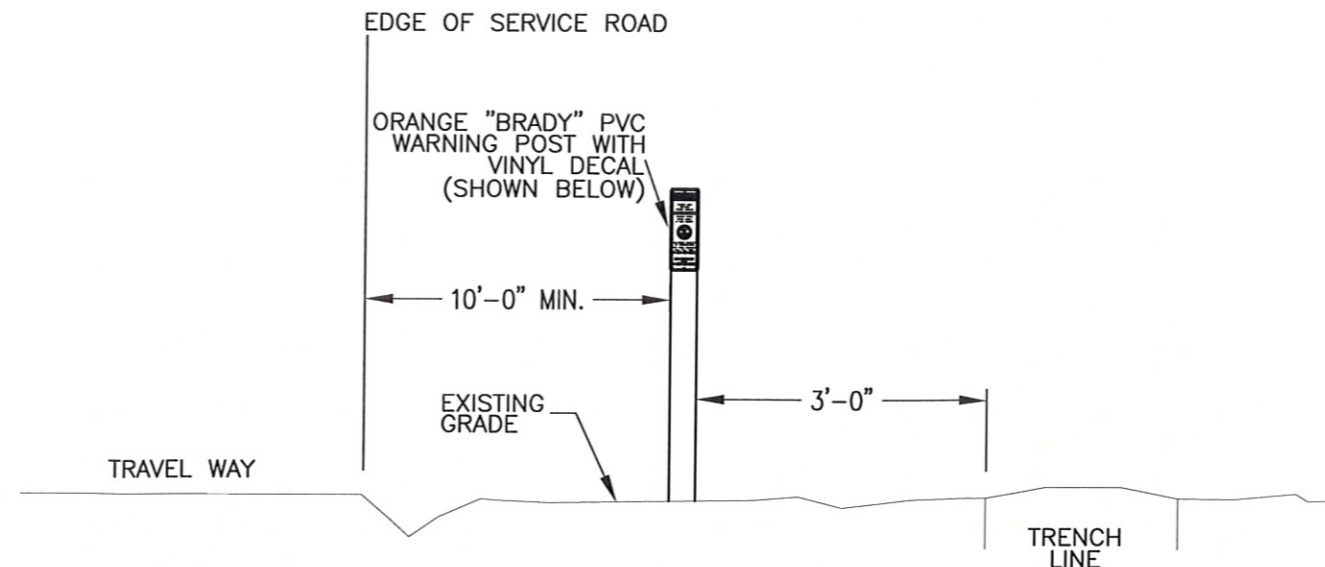


ENGINEERING RECORD		DATE
DRAWN	SRF	8/26/10
DESIGNED	BDJ	8/26/10
CHECKED	DRM	9/28/10
APPROVED	DRM	9/28/10
DWG SCALE: 1"=1'-0"		PLT SCALE: 1:1

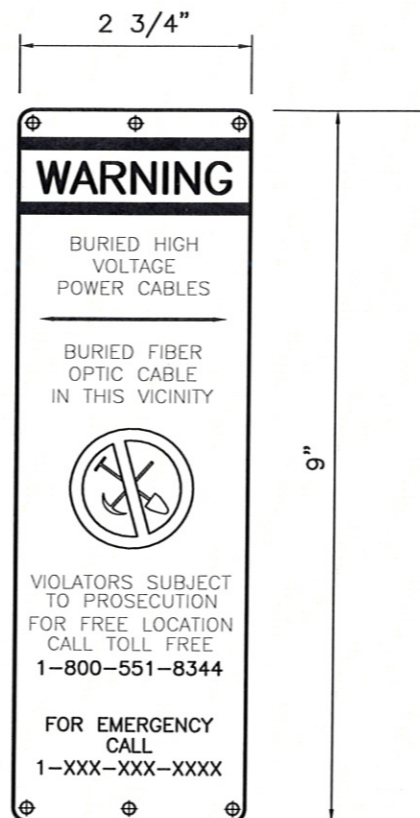
LANDUSKY WIND ENERGY PROJECT	
24.94 kV UNDERGROUND COLLECTOR SYSTEM	
TRENCH DETAILS (TREFOIL CONFIGURATION)	
DWG. NAME: SPE-B-D002	REVISION NO.: A



DETAIL
MARKER PLACEMENT ALONG TRENCH LINE 1



DETAIL
MARKER PLACEMENT ALONG ROAD WAY 2



PRELIMINARY
NOT FOR CONSTRUCTION

GENERAL NOTES

1. FIBERGLASS COMPOSITE MARKER SHALL BE ULTRA VIOLET (UV) STABILIZED. FIBERGLASS MARKER POLES SHALL BE 3.75 IN. BY 72 IN., WITH A WEIGHT OF 1.8 LBS. PER FOOT, AND A MINIMUM TENSILE STRENGTH OF 65,000 PSI AS MEASURED IN ACCORDANCE WITH ASTM D638.
2. MARKER POLES SHALL BE BURIED A MINIMUM OF 18"
3. ROUTE MARKERS SHALL BE PLACED AT ALL ROUTING ANGLES, ROAD X-ING'S, UTILITY X-ING'S, EVERY 500 FT. OR LINE OF SIGHT AND AT EDGE OF CULTIVATED FIELDS.

FILE LOCATION: L:\SPECTRUM ENG\ZORTMAN-LANDUSKY WIND\CADD\WORKING\COLLECTOR SYSTEM DRAWINGS\SPEB003.DWG LAST SAVED BY: sfowler 9/30/2010 2:15 PM PLOTTED BY: Brigitte N. Schmidt 7/28/2011 10:04 AM Tab:Layout1



NO.	REVISION	DATE	BY	APR
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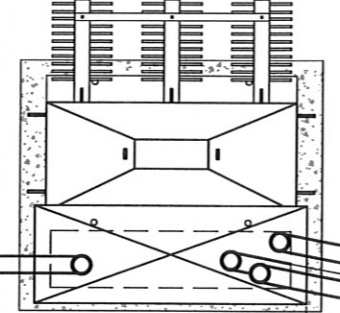
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DRAWN	SRF	8/26/10
DESIGNED	BDJ	8/26/10
CHECKED	DRM	9/28/10
APPROVED	DRM	9/28/10
DWG SCALE: NONE	PLT SCALE: 1:1	

LANDUSKY WIND ENERGY PROJECT	
24.94 kV UNDERGROUND COLLECTOR SYSTEM	
WARNING POST DETAILS	
DWG. NAME: SPE-B-0003	REVISION NO: A



NATURAL SELECT FILL COMPACTED TO 95% PER ASTM D-698 FROM GRADE TO TOP OF WIND TURBINE SPREAD FOOTING FOUNDATION AROUND ALL CONDUITS.

TRANSFORMER



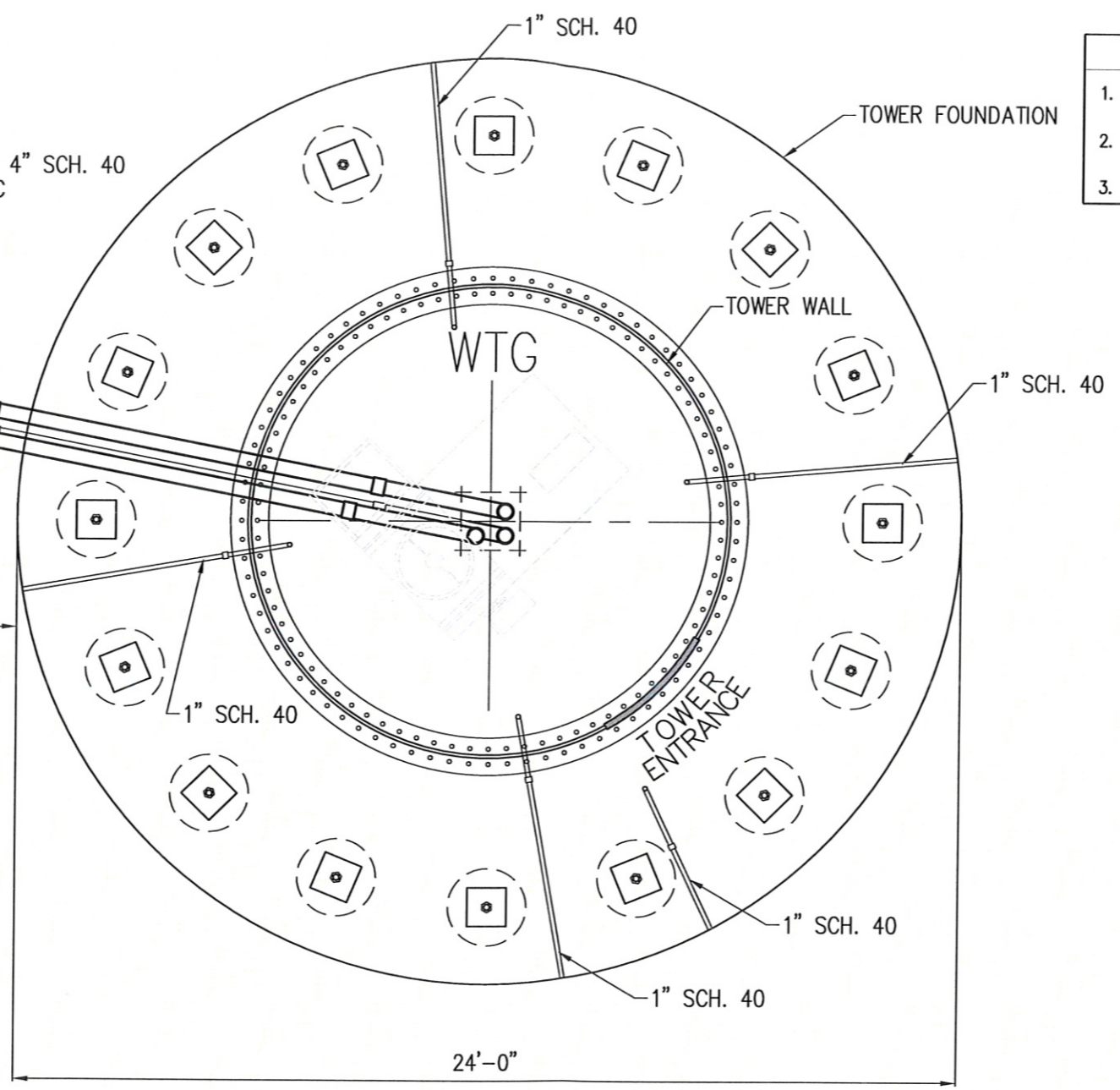
HV LV

4" SCH. 40 PVC

TO NEW 25 kV SWITCHGEAR NEAR LPED2

(3) 4" SCH. 40 PVC

6'-0"



PLAN VIEW

MINIMUM BENDING RADIUS OF CONDUCTORS	
SINGLE & MULT. CONDUCTOR 12x CABLE DIA.	CONDUCTOR DESCRIPTION
15.192"	#1/0 AWG, 28 kV, 280 mil EPR, 19 str. AL
14.712"	750 kcmil, 600V, 110 mil XLPE, 61 str. CU

GENERAL NOTES

1. VERIFY ALL DIMENSIONS WITH FOUNDATION ENGINEER, BUILDER AND TOWER MANUFACTURER PRIOR TO CONSTRUCTION.
2. CONFIGURATION SHOWN IS FOR DIAGRAMMATIC PURPOSES ONLY, ACTUAL INSTALLED CONFIGURATION MAY VARY.
3. SEE SHEET SPE-B-D004-4 FOR CONDUIT MATERIALS.

* BIDDER NOTE:
FOUNDATION SHOWN IS REPRESENTATIVE ONLY. FINAL FOUNDATION DESIGN SHALL FOLLOW WTG MANUFACTURER SPECIFICATIONS.

PRELIMINARY
NOT FOR CONSTRUCTION

FILE LOCATION: L:\SPECTRUM ENG\ZORTMAN-LANDUSKY WIND\CADD\WORKING\COLLECTOR SYSTEM DRAWINGS\SPEB00041.DWG LAST SAVED BY: sfowler 9/30/2010 2:17 PM PLOTTED BY: Briquette N. Schmidt 7/28/2011 10:09 AM Tab: SPEB0004-1



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A	ISSUE FOR INTERCONNECTION APPLICATION	9/28/10	SRF	DRM



ENGINEERING RECORD		DATE
DRAWN	SRF	8/26/10
DESIGNED	BDJ	8/26/10
CHECKED	DRM	9/28/10
APPROVED	DRM	9/28/10
DWG SCALE:	NONE	PLT SCALE: 1:1

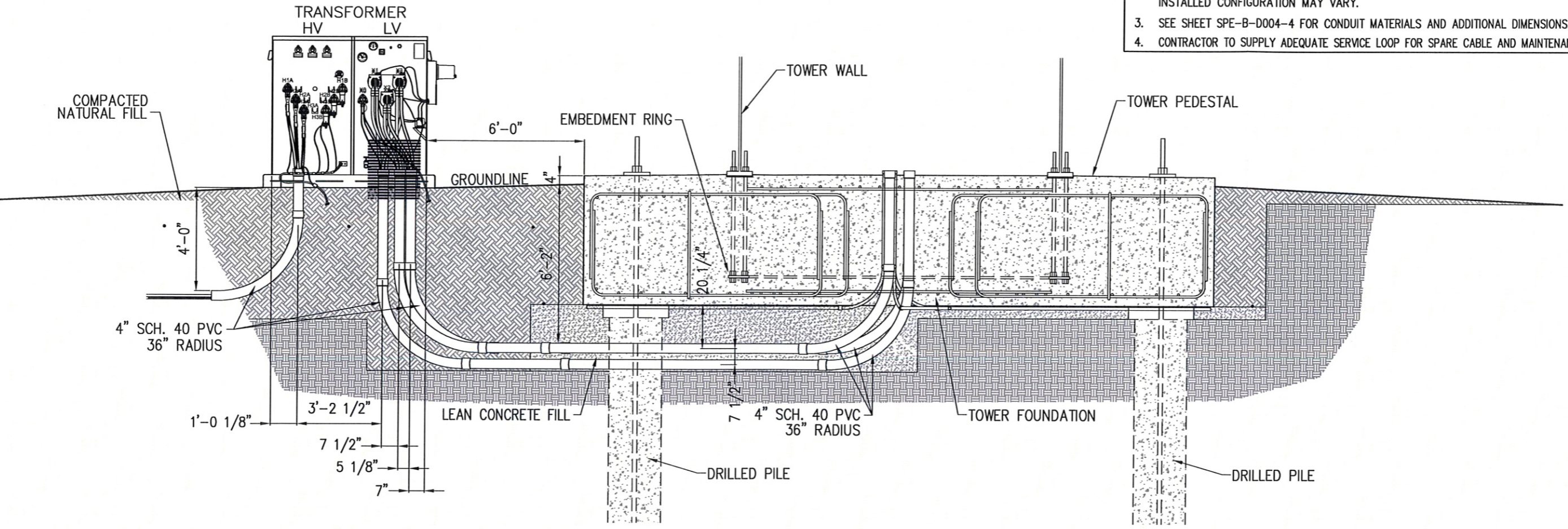
LANDUSKY WIND ENERGY PROJECT	
24.94 kV UNDERGROUND COLLECTOR SYSTEM	
TOWER ENTRANCE DETAILS (Overview)	
DWG. NAME:	SPE-B-D004-1
REVISION NO :	A

MINIMUM BENDING RADIUS OF CONDUCTORS

SINGLE & MULT. CONDUCTOR 12x CABLE DIA.	CONDUCTOR DESCRIPTION
15.192"	#1/0 AWG, 28 kV, 280 mil EPR, 19 str. AL
14.712"	750 kcmil, 600V, 110 mil XLPE, 61 str. CU

GENERAL NOTES

1. VERIFY ALL DIMENSIONS WITH FOUNDATION ENGINEER, BUILDER AND TOWER MANUFACTURER PRIOR TO INSTALLATION OF TOWER ENTRANCE CONDUITS.
2. CONFIGURATION SHOWN IS FOR DIAGRAMMATIC PURPOSES ONLY, ACTUAL INSTALLED CONFIGURATION MAY VARY.
3. SEE SHEET SPE-B-D004-4 FOR CONDUIT MATERIALS AND ADDITIONAL DIMENSIONS.
4. CONTRACTOR TO SUPPLY ADEQUATE SERVICE LOOP FOR SPARE CABLE AND MAINTENANCE.



SECTION
600V and 15kV Conduits

A
005-1

* BIDDER NOTE:
FOUNDATION SHOWN IS REPRESENTATIVE ONLY. FINAL FOUNDATION DESIGN SHALL FOLLOW WTG MANUFACTURER SPECIFICATIONS.

PRELIMINARY
NOT FOR CONSTRUCTION

FILE LOCATION: L:\SPECTRUM ENG\ZORTMAN-LANDUSKY WIND\CADD\WORKING\COLLECTOR SYSTEM DRAWINGS\SPEBD0042.DWG LAST SAVED BY: sfowler 9/30/2010 2:18 PM PLOTTED BY: Brigette N. Schmidt 7/28/2011 10:10 AM Tab: SPEBD004-2

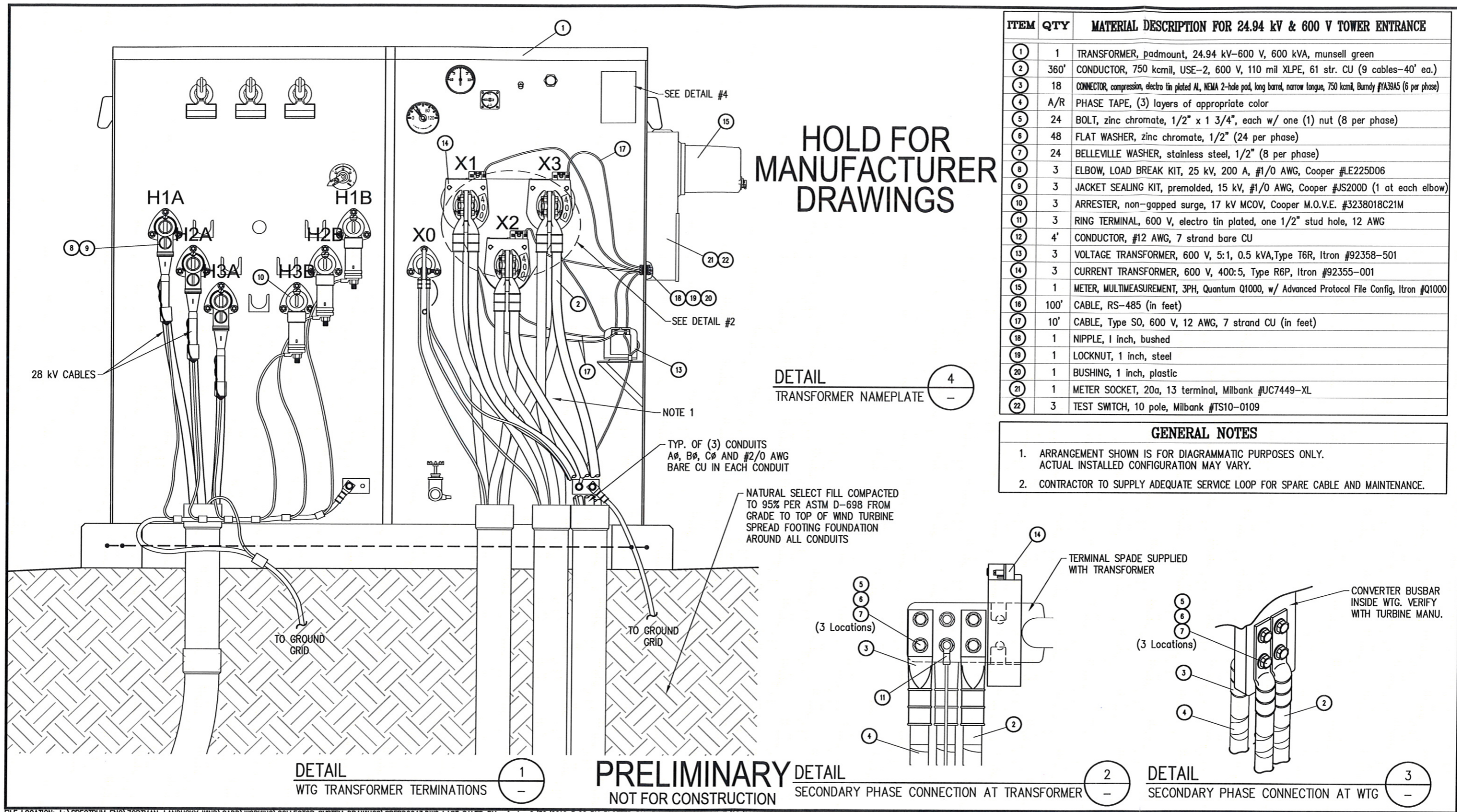
Engineering with Distinction
ECI ELECTRICAL CONSULTANTS, INC.
ILLINOIS • MONTANA

NO	REVISION	DATE	BY	APR
A	ISSUE FOR INTERCONNECTION APPLICATION	9/28/10	SRF	DRM

Spectrum
Mining Engineers and
AML Reclamation Specialists
engineering

ENGINEERING RECORD		DATE
DRAWN	SRF	8/26/10
DESIGNED	BDJ	8/26/10
CHECKED	DRM	9/28/10
APPROVED	DRM	9/28/10
DWG SCALE: 1/2"=1'-0"		PLT SCALE: 1:1

LANDUSKY WIND ENERGY PROJECT
24.94 kV UNDERGROUND COLLECTOR SYSTEM
TOWER ENTRANCE DETAILS (Cross Section)
DWG. NAME: SPE-B-D004-2
REVISION NO: A



ITEM	QTY	MATERIAL DESCRIPTION FOR 24.94 kV & 600 V TOWER ENTRANCE
1	1	TRANSFORMER, padmount, 24.94 kV-600 V, 600 kVA, munsell green
2	360'	CONDUCTOR, 750 kcmil, USE-2, 600 V, 110 mil XLPE, 61 str. CU (9 cables-40' ea.)
3	18	CONNECTOR, compression, electro tin plated AL, NEMA 2-hole pad, long barrel, narrow tongue, 750 kcmil, Bundy #YA38A5 (6 per phase)
4	A/R	PHASE TAPE, (3) layers of appropriate color
5	24	BOLT, zinc chromate, 1/2" x 1 3/4", each w/ one (1) nut (8 per phase)
6	48	FLAT WASHER, zinc chromate, 1/2" (24 per phase)
7	24	BELLEVILLE WASHER, stainless steel, 1/2" (8 per phase)
8	3	ELBOW, LOAD BREAK KIT, 25 kV, 200 A, #1/0 AWG, Cooper #LE225D06
9	3	JACKET SEALING KIT, premolded, 15 kV, #1/0 AWG, Cooper #JS200D (1 at each elbow)
10	3	ARRESTER, non-gapped surge, 17 kV MCOV, Cooper M.O.V.E. #3238018C21M
11	3	RING TERMINAL, 600 V, electro tin plated, one 1/2" stud hole, 12 AWG
12	4'	CONDUCTOR, #12 AWG, 7 strand bare CU
13	3	VOLTAGE TRANSFORMER, 600 V, 5:1, 0.5 kVA, Type T6R, Itron #92358-501
14	3	CURRENT TRANSFORMER, 600 V, 400:5, Type R6P, Itron #92355-001
15	1	METER, MULTIMEASUREMENT, 3PH, Quantum Q1000, w/ Advanced Protocol File Config, Itron #Q1000
16	100'	CABLE, RS-485 (in feet)
17	10'	CABLE, Type SO, 600 V, 12 AWG, 7 strand CU (in feet)
18	1	NIPPLE, 1 inch, bushed
19	1	LOCKNUT, 1 inch, steel
20	1	BUSHING, 1 inch, plastic
21	1	METER SOCKET, 20a, 13 terminal, Milbank #UC7449-XL
22	3	TEST SWITCH, 10 pole, Milbank #TS10-0109

GENERAL NOTES

- ARRANGEMENT SHOWN IS FOR DIAGRAMMATIC PURPOSES ONLY. ACTUAL INSTALLED CONFIGURATION MAY VARY.
- CONTRACTOR TO SUPPLY ADEQUATE SERVICE LOOP FOR SPARE CABLE AND MAINTENANCE.

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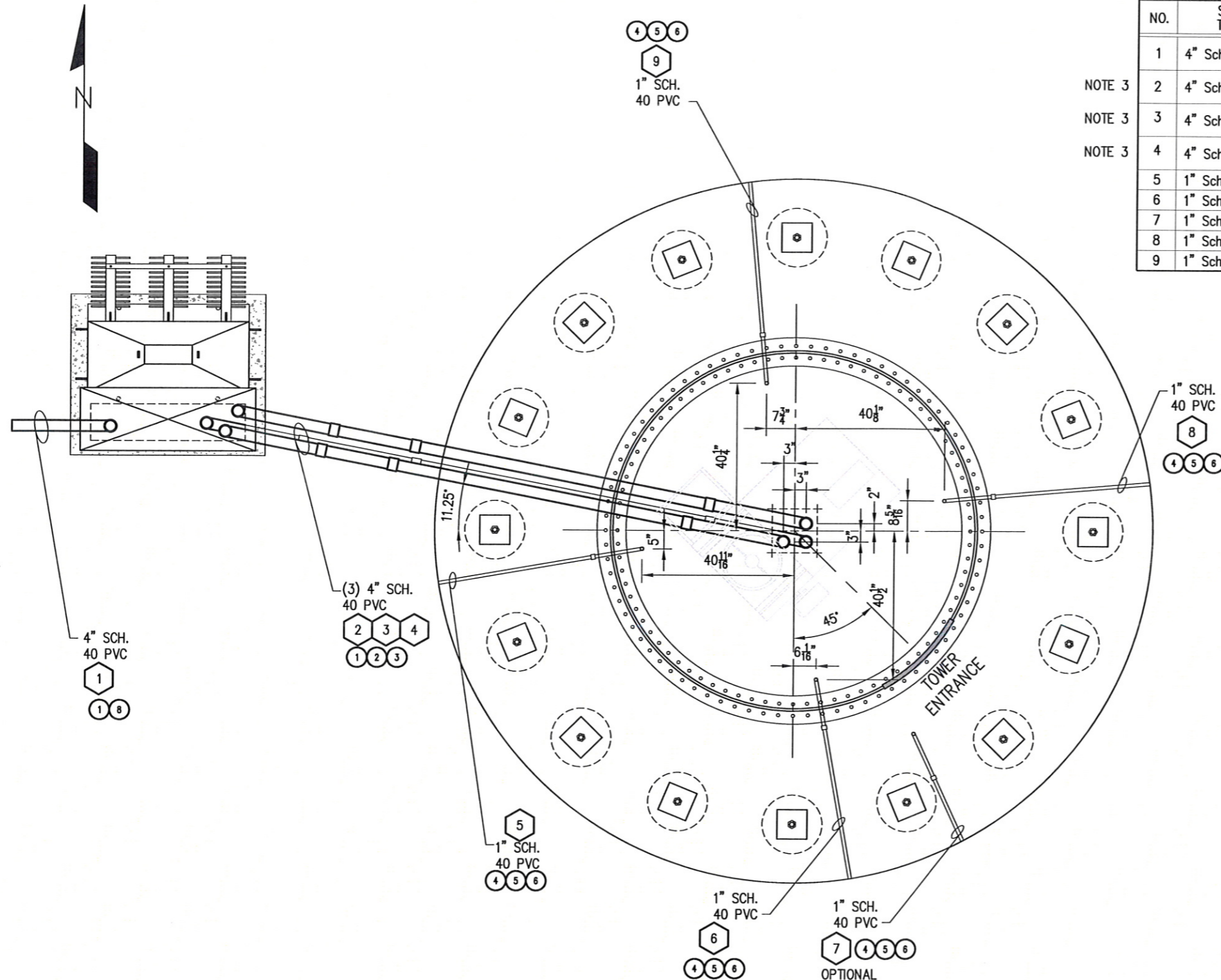


NO	REVISION	DATE	BY	APR
A	ISSUE FOR INTERCONNECTION APPLICATION	9/28/10	SRF	DRM



ENGINEERING RECORD		DATE
DRAWN	SRF	8/26/10
DESIGNED	BDJ	8/26/10
CHECKED	DRM	9/28/10
APPROVED	DRM	9/28/10
DWG SCALE: NONE	PLT SCALE: 1:1	

LANDUSKY WIND ENERGY PROJECT	
24.94 kV UNDERGROUND COLLECTOR SYSTEM	
TOWER ENTRANCE DETAILS (RADIAL FEED TRANSFORMER #2/0 AWG)	
DWG. NAME: SPE-B-D004-3	REVISION NO: A



CONDUIT SCHEDULE				
NO.	SIZE TYPE	FROM	TO	CABLE CONTENTS
1	4" Sch. 40 PVC	600 V-24.94 kV TRANSFORMER	EXISTING UTILITY	(3) #1/0 AWG 28 kV URD AL (1) #6 AWG min. Bare CU
2	4" Sch. 40 PVC	600 V-24.94 kV TRANSFORMER	CB1 IN CONTROLLER	(3) 750 kcmil 600V USE-2 CU (1) #2/0 AWG Bare CU
3	4" Sch. 40 PVC	600 V-24.94 kV TRANSFORMER	CB1 IN CONTROLLER	(3) 750 kcmil 600V USE-2 CU (1) #2/0 AWG Bare CU
4	4" Sch. 40 PVC	600 V-24.94 kV TRANSFORMER	CB1 IN CONTROLLER	(3) 750 kcmil 600V USE-2 CU (1) #2/0 AWG Bare CU
5	1" Sch. 40 PVC	CONVERTER LEG	GROUND RING	(1) #4/0 AWG Bare CU
6	1" Sch. 40 PVC	TOWER WALL BOND	GROUND RING	(1) #4/0 AWG Bare CU
7	1" Sch. 40 PVC	TOWER STAIR BOND	GROUND RING	(1) #4/0 AWG Bare CU
8	1" Sch. 40 PVC	CONVERTER LEG	GROUND RING	(1) #4/0 AWG Bare CU
9	1" Sch. 40 PVC	TOWER STAIR BOND	WTG PATCH PANEL	(1) #4/0 AWG Bare CU

ITEM	QTY	MATERIAL DESCRIPTION FOR 600 V TOWER ENTRANCE
1	45'	CONDUIT, 4" Sch. 40, Bell End
2	9	COUPLING, 4" Sch. 40, Standard
3	7	SWEEP, 90°, 4" Sch. 40, 36" radius, Bell end
4	25'	CONDUIT, 1" Sch. 40, Bell end
5	5	COUPLING, 1" Sch. 40, Standard
6	5	SWEEP, 90°, 1" Sch. 40, 18" radius, Bell end
7	5	CONDUIT BUSHING, for 1 inch PVC
8	1	CONDUIT BUSHING, for 4 inch PVC

GENERAL NOTES

- VERIFY ALL DIMENSIONS WITH FOUNDATION ENGINEER, BUILDER AND TOWER MANUFACTURER PRIOR TO CONSTRUCTION.
- CONFIGURATION SHOWN IS FOR DIAGRAMMATIC PURPOSES ONLY, ACTUAL INSTALLED CONFIGURATION MAY VARY.
- ALTERNATE OPTIONS ARE AVAILABLE FOR CONDUITS 2, 3, AND 4 ROUTING TO THE PADMOUNT TRANSFORMER.

* BIDDER NOTE:
FOUNDATION SHOWN IS REPRESENTATIVE ONLY. FINAL FOUNDATION DESIGN SHALL FOLLOW WTG MANUFACTURER SPECIFICATIONS.

PRELIMINARY
NOT FOR CONSTRUCTION

NOTE: ADEQUATELY SEAL ALL CONDUITS TO PROTECT AGAINST RODENT/DIRT INTRUSION FROM OUTSIDE

FILE LOCATION: L:\SPECTRUM ENG\ZORTMAN-LANDUSKY WIND\CADD\WORKING\COLLECTOR SYSTEM DRAWINGS\SPEB00044.DWG LAST SAVED BY: sfowler 9/30/2010 2:23 PM PLOTTED BY: Brigitte N. Schmidt 7/28/2011 10:11 AM Tab: SPEB0004-4

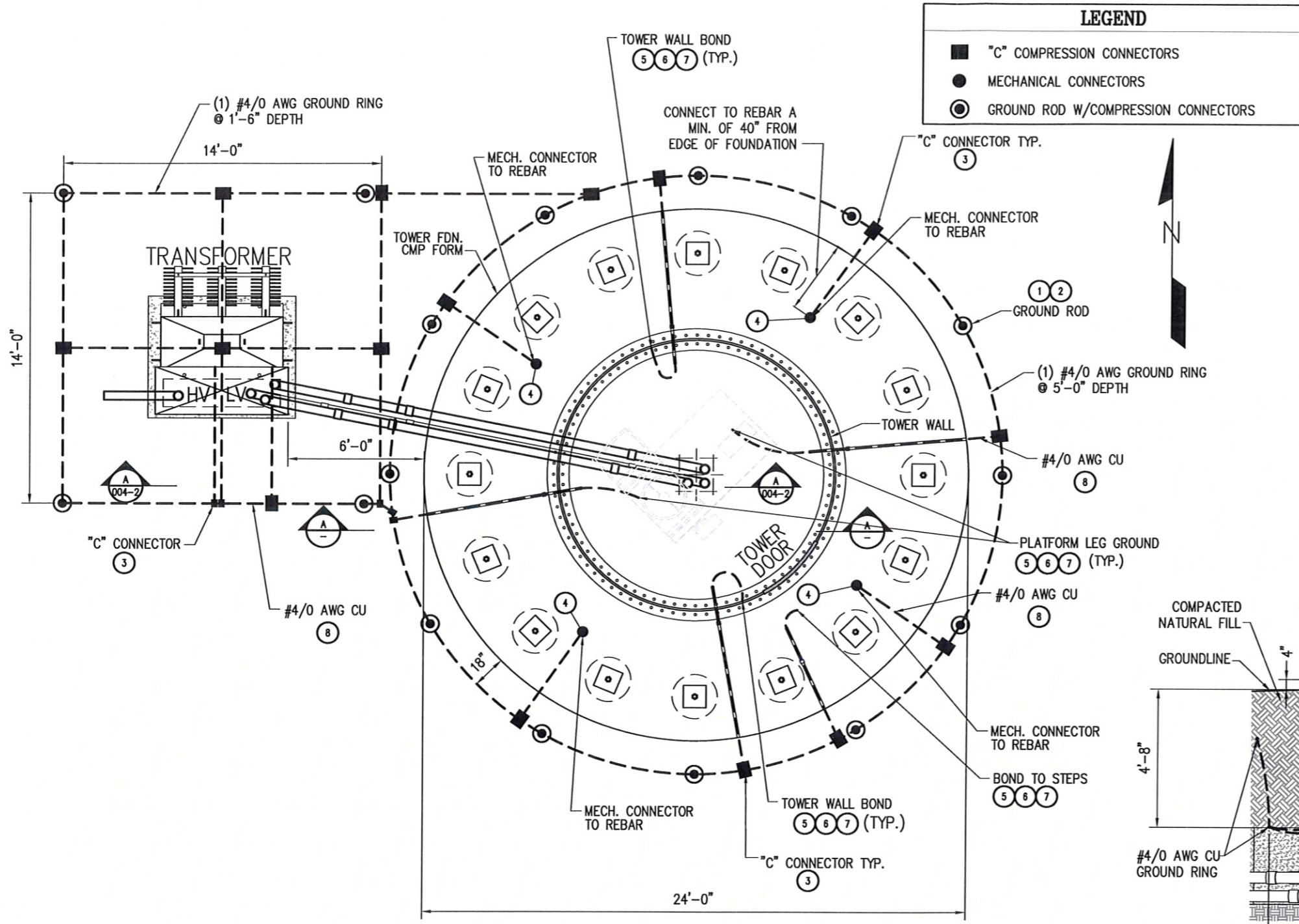


NO	REVISION	DATE	BY	APR
A	ISSUE FOR INTERCONNECTION APPLICATION	9/28/10	SRF	DRM



ENGINEERING RECORD		DATE
DRAWN	SRF	8/26/10
DESIGNED	BDJ	8/26/10
CHECKED	DRM	9/28/10
APPROVED	DRM	9/28/10
DWG SCALE: NONE	PLT SCALE: 1:1	

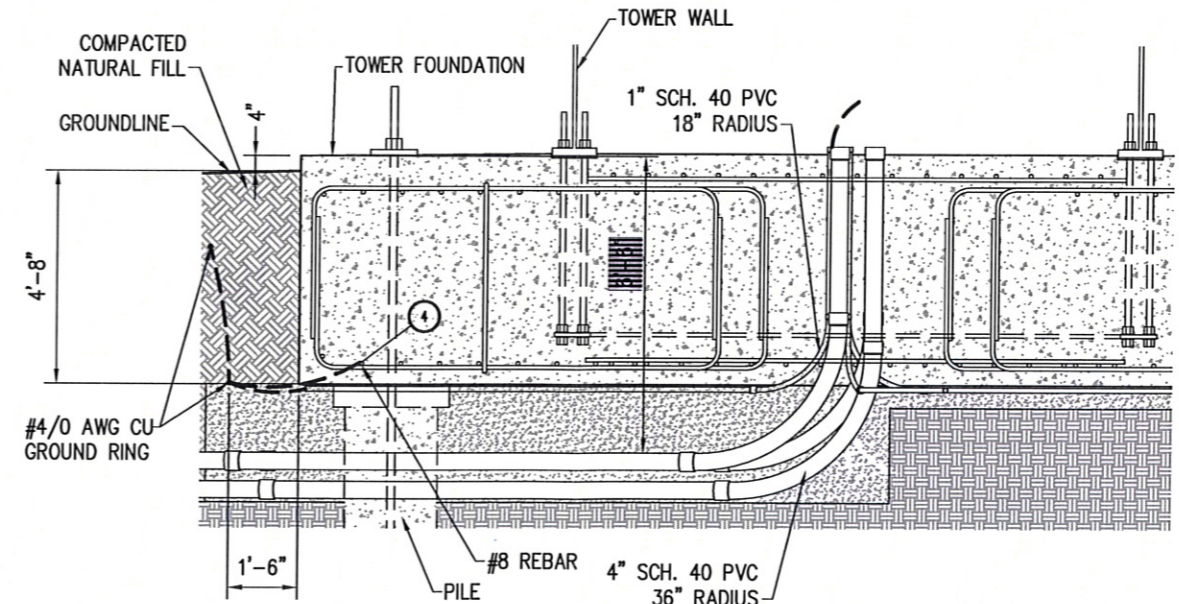
LANDUSKY WIND ENERGY PROJECT	
24.94 kV UNDERGROUND COLLECTOR SYSTEM	
TOWER ENTRANCE DETAILS (CONDUIT)	
DWG. NAME: SPE-B-D004-4	REVISION NO: A



LEGEND	
■	"C" COMPRESSION CONNECTORS
●	MECHANICAL CONNECTORS
⊙	GROUND ROD W/COMPRESSION CONNECTORS

ITEM	QTY	MATERIAL DESCRIPTION FOR UMGG
1	16	CONNECTOR, compression "Hybrid", #4/0 AWG to 5/8" rod, Burndy #YGL29C29 or YGL34C29
2	16	GROUND ROD, 5/8" x 10', copperbonded, 13 mil min., 15 mil average, CU
3	20	COMPRESSION CONNECTOR, 'C', #4/0 AWG to #4/0 AWG, Burndy #YGH29C29
4	4	CONNECTOR, mechanical, #4/0 AWG to #8 rebar, Burndy #GAR1429
5	5	COMPRESSION CONNECTOR, NEMA 1-hole pad, #4/0 AWG, tower wall base plate & step Burndy #YA28L (Tower wall and step terminations not shown)
6	5	BOLT, zinc chromate, 1/2" x 1-3/4", each w/ one (1) nut
7	10	LOCK WASHER, zinc chromate, 1/2"
8	276'	CONDUCTOR, grounding, #4/0 AWG, Bare CU, 19 strand

- GENERAL NOTES**
1. EACH 600V SECONDARY CONDUIT SHALL INCLUDE A BARE GROUND AND SHALL BE SOLIDLY CONNECTED TO THE CONDUCTOR NEUTRAL IN SUCH A WAY IF ONE SINGLE CONNECTION IS REMOVED ALL NEUTRALS REMAIN GROUNDED.
 2. DESIGN IS BASED UPON A 2 OHM WTG RESISTANCE TO REMOTE EARTH. IF MEASUREMENTS INDICATE HIGHER RESISTIVITY, ADDITIONAL GROUNDING MAY BE REQUIRED AS SPECIFIED BY THE ENGINEER.
 3. REFER TO DRAWING SPE-B-D004-4 FOR GROUNDING & POWER DUCT MATERIALS.
 4. ARRANGEMENT SHOWN IS DIAGRAMMATIC ONLY, ACTUAL INSTALLED CONFIGURATION MAY VARY.



PLAN VIEW

* BIDDER NOTE:
FOUNDATION SHOWN IS REPRESENTATIVE ONLY. FINAL FOUNDATION DESIGN SHALL FOLLOW WTG MANUFACTURER SPECIFICATIONS.

SECTION

TYPICAL GROUNDING CONDUIT ENTRANCE

PRELIMINARY
NOT FOR CONSTRUCTION

FILE LOCATION: L:\SPECTRUM ENG\ZORTMAN-LANDUSKY WIND\CADD\WORKING\COLLECTOR SYSTEM DRAWINGS\SPEB00051.DWG LAST SAVED BY: sfowler 9/30/2010 2:24 PM PLOTTED BY: Briette N. Schmidt 7/28/2011 10:12 AM Tab: SPEB005-1

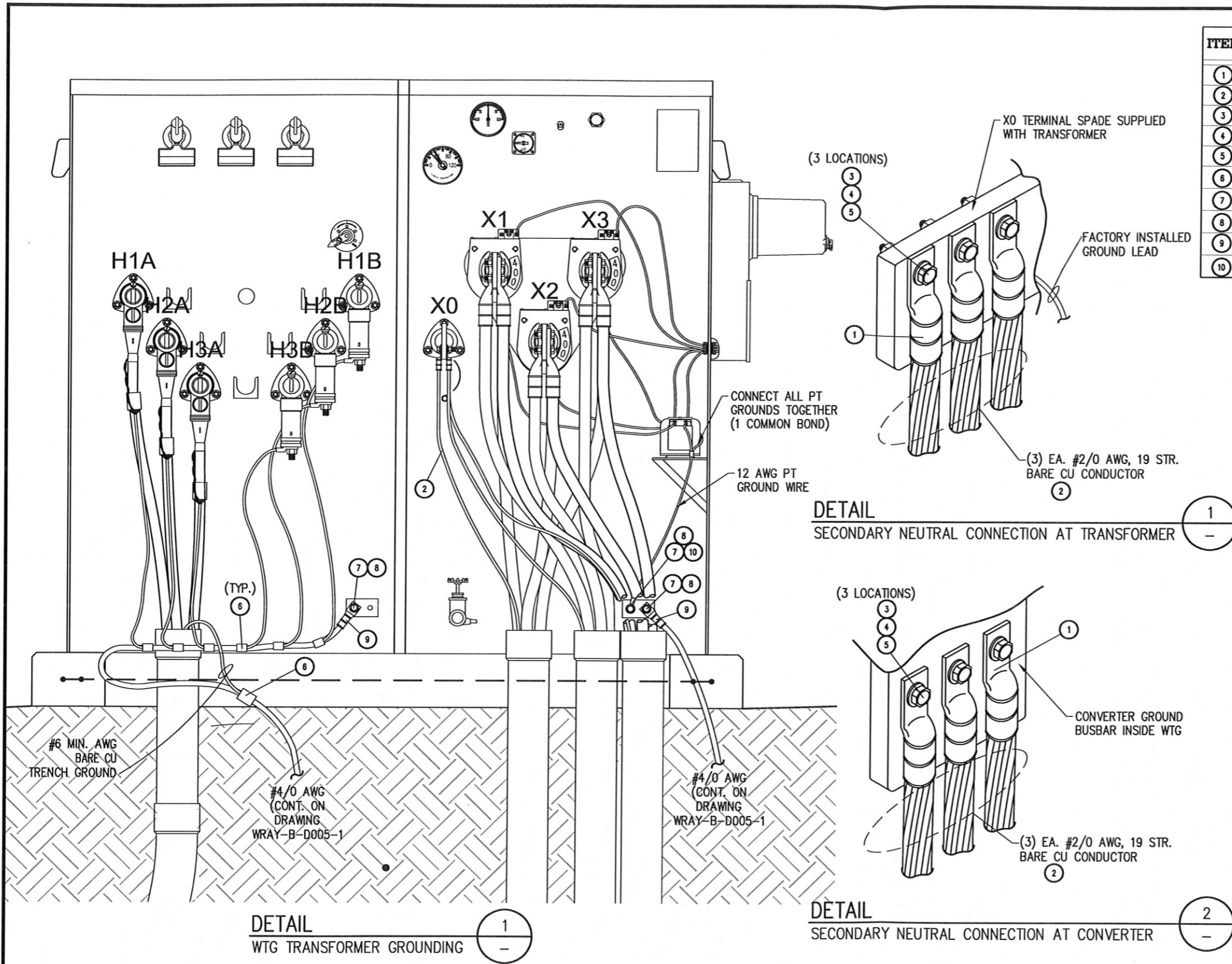


NO	REVISION	DATE	BY	APR
A	ISSUE FOR INTERCONNECTION APPLICATION	9/28/10	SRF	DRM



ENGINEERING RECORD		DATE
DRAWN	SRF	8/26/10
DESIGNED	BDJ	8/26/10
CHECKED	DRM	9/28/10
APPROVED	DRM	9/28/10

LANDUSKY WIND ENERGY PROJECT	
24.94 kV UNDERGROUND COLLECTOR SYSTEM	
TOWER GROUNDING (OVERVIEW)	
DWG. NAME:	SPE-B-D005-1
REVISION NO:	A



ITEM	QTY	MATERIAL DESCRIPTION FOR UMGG
①	6	COMPRESSION CONNECTOR, NEMA 1-hole pad, long barrel, #2/0 AWG, Burndy #YA26N
②	120'	CONDUCTOR, grounding, #2/0 AWG, Bare CU, 19 strand (3 conductors-40' ea.)
③	6	BOLT, zinc chromate, 1/2" x 1 1/2", each w/ one (1) nut
④	12	FLAT WASHER, zinc chromate, 1/2"
⑤	6	BELLEVILLE WASHER, stainless steel, 1/2"
⑥	7	COMPRESSION CONNECTOR, "C", #2 AWG, Conc. Neutral or Surge Arrester drain wire (#4 AWG) to #4/0 AWG, Burndy #YGC29C26
⑦	3	BOLT, zinc chromate, 1/2" x 1 1/2"
⑧	3	LOCK WASHER, zinc chromate, 1/2"
⑨	2	COMPRESSION CONNECTOR, NEMA 1-hole pad, #4/0 AWG, Burndy #YA28
⑩	1	RING TERMINAL, 600V, electro tin plated, one 1/2" stud hole, 12 AWG

- GENERAL NOTES**
1. EACH 12.47kV PRIMARY AND 600V SECONDARY CONDUIT SHALL INCLUDE A BARE GROUND AND SHALL BE SOLIDLY CONNECTED TO THE CONDUCTOR NEUTRAL IN SUCH A WAY IF ONE SINGLE CONNECTION IS REMOVED ALL ALL NEUTRALS REMAIN GROUNDED.
 2. DESIGN IS BASED UPON A 2 OHM WTG RESISTANCE TO REMOTE EARTH. IF MEASUREMENTS INDICATE HIGHER RESISTIVITY, ADDITIONAL GROUNDING MAY BE REQUIRED AS SPECIFIED BY THE ENGINEER.
 3. REFER TO DRAWING SPE-B-D004-4 FOR 1" GROUNDING AND 4" POWER DUCT MATERIALS.
 4. ARRANGEMENT SHOWN IS FOR DIAGRAMMATIC PURPOSES ONLY. ACTUAL INSTALLED CONFIGURATION MAY VARY.

DETAIL
SECONDARY NEUTRAL CONNECTION AT TRANSFORMER ①

DETAIL
SECONDARY NEUTRAL CONNECTION AT CONVERTER ②

PRELIMINARY
NOT FOR CONSTRUCTION

FILE LOCATION: L:\SPECTRUM ENG\ZORTMAN-LANDUSKY WIND\CADD\WORKING\COLLECTOR SYSTEM DRAWINGS\SPEB00052.DWG LAST SAVED BY: sfowler 9/30/2010 2:25 PM PLOTTED BY: Briette N. Schmidt 7/28/2011 10:12 AM Tab: SPEB0005-2

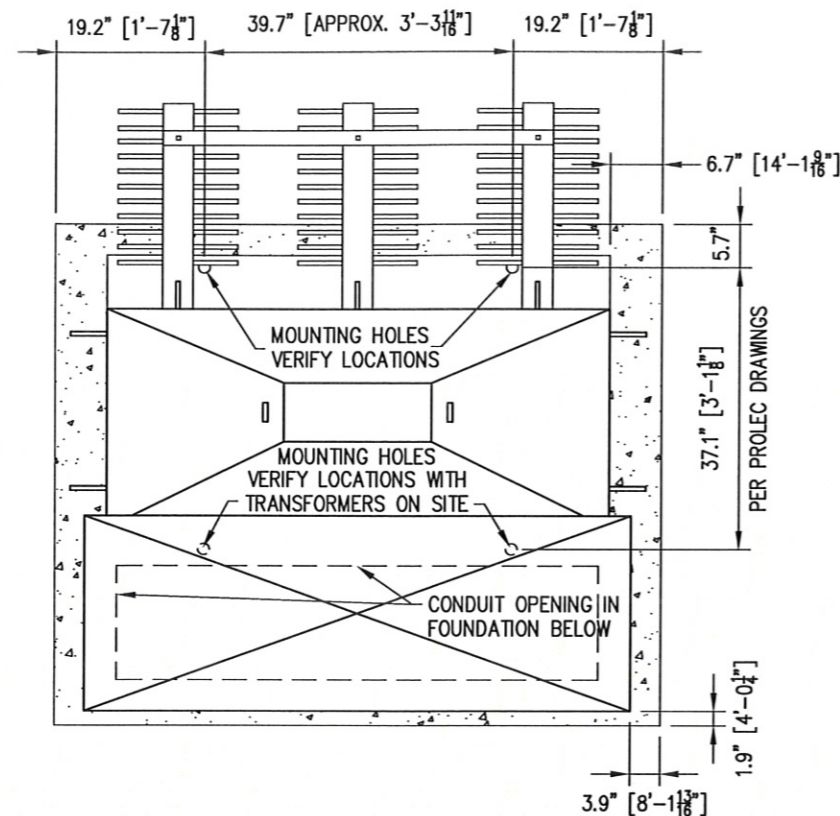


NO	REVISION	DATE	BY	APR
A	ISSUE FOR INTERCONNECTION APPLICATION	9/28/10	SRF	DRM

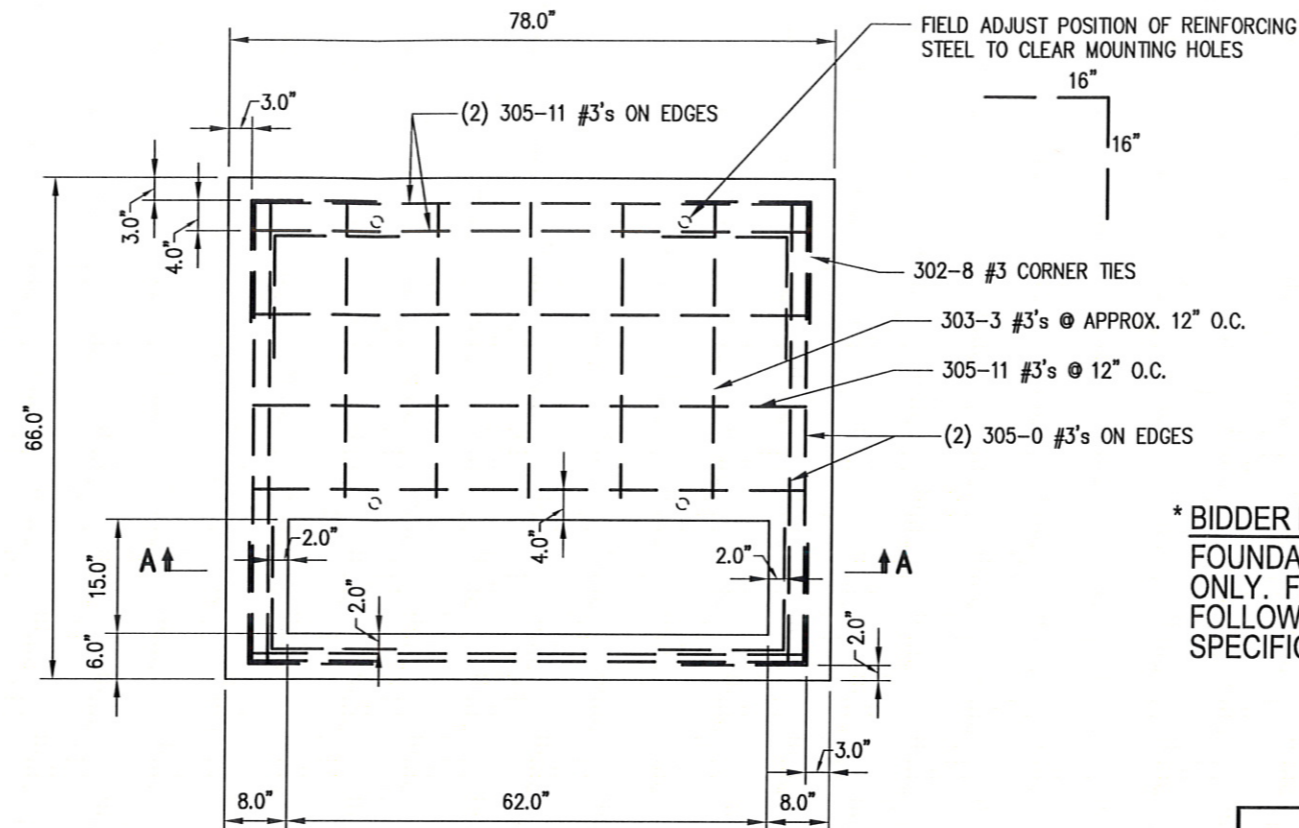


ENGINEERING RECORD		DATE
DRAWN	SRF	8/26/10
DESIGNED	BDJ	8/26/10
CHECKED	DRM	9/28/10
APPROVED	DRM	9/28/10
DWG SCALE: NONE		PLT SCALE: 1:1

LANDUSKY WIND ENERGY PROJECT	
24.94 kV UNDERGROUND COLLECTOR SYSTEM	
TRANSFORMER GROUNDING DETAILS	
DWG. NAME: SPE-B-D005-2	REVISION NO: A



TRANSFORMER PLACEMENT ON FOUNDATION



* BIDDER NOTE:
FOUNDATION SHOWN IS REPRESENTATIVE ONLY. FINAL FOUNDATION DESIGN SHALL FOLLOW TRANSFORMER MANUFACTURER SPECIFICATIONS.

PRELIMINARY
NOT FOR CONSTRUCTION

NOTES

1. PROJECTION OF CONCRETE ABOVE SUBGRADE WILL VARY DEPENDING ON TOP OF CONCRETE ELEVATIONS ESTABLISHED ON THE FOUNDATION PLAN (SEE REFERENCE DRAWINGS FOR DRAWING IDENTIFICATION). EXCAVATE AND FORM AS REQUIRED.
2. SEE SPECIFICATIONS FOR CONCRETE MIX AND PLACEMENT (3000 PSI MIN.).
3. ALL BACKFILL AROUND SLABS AND CONTROL BUILDING FOUNDATION SHALL BE SLOPED TO DIRECT RUNOFF AWAY FROM FOUNDATION.
4. IF REINFORCING IS TO BE WELDED, USE ASTM A706 REINFORCING.
5. ORIENTATION & LOCATION OF FOUNDATION TO BE VERIFIED BY CONTRACTOR PRIOR TO CONSTRUCTION.

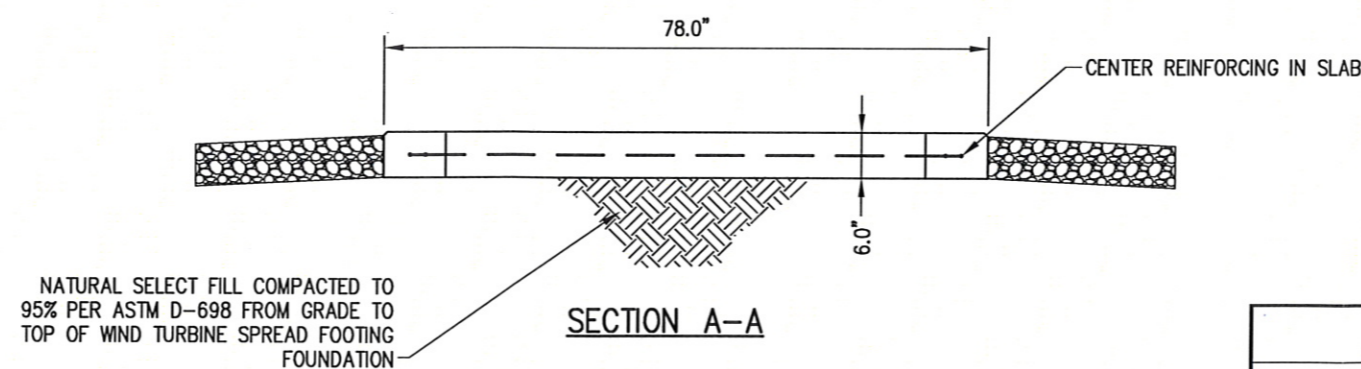
LEGEND

A↑ ——— INDICATES SECTION VIEW "A-A"

STANDARD BAR TYPES

STRAIGHT	HOOK	STIRRUPS	HOOPS	SQ. HOOPS	RECT. TIE

REINFORCING SCHEDULE (EACH FOUNDATION)							
MARK	QTY.	SIZE	UNBENT LENGTH (L)	SHAPE	DIM a	DIM b	DIM c
302-8	8	#3	2'-8"	HOOK	16"	16"	
303-3	5	#3	3'-3"	STRAIGHT	3'-3"		
305-0	4	#3	5'-0"	STRAIGHT	5'-0"		
305-11	7	#3	5'-11"	STRAIGHT	5'-11"		
MATERIAL SUMMARY (EACH FOUNDATION)							
TOTAL CONCRETE: 0.53 CU. YDS. EA							
TOTAL REINFORCING: #3- 99 FT.							
TOTAL WEIGHT: 37.2 LBS.							



500 kVA PADMOUNT TRANSFORMER FOUNDATION

FILE LOCATION: L:\SPECTRUM ENG\ZORTMAN-LANDUSKY WIND\CADD\WORKING\COLLECTOR SYSTEM DRAWINGS\SPEB0008.DWG LAST SAVED BY: sfowler 9/30/2010 2:28 PM PLOTTED BY: Brigette N. Schmidt 7/28/2011 10:05 AM Tab: SPEB0008

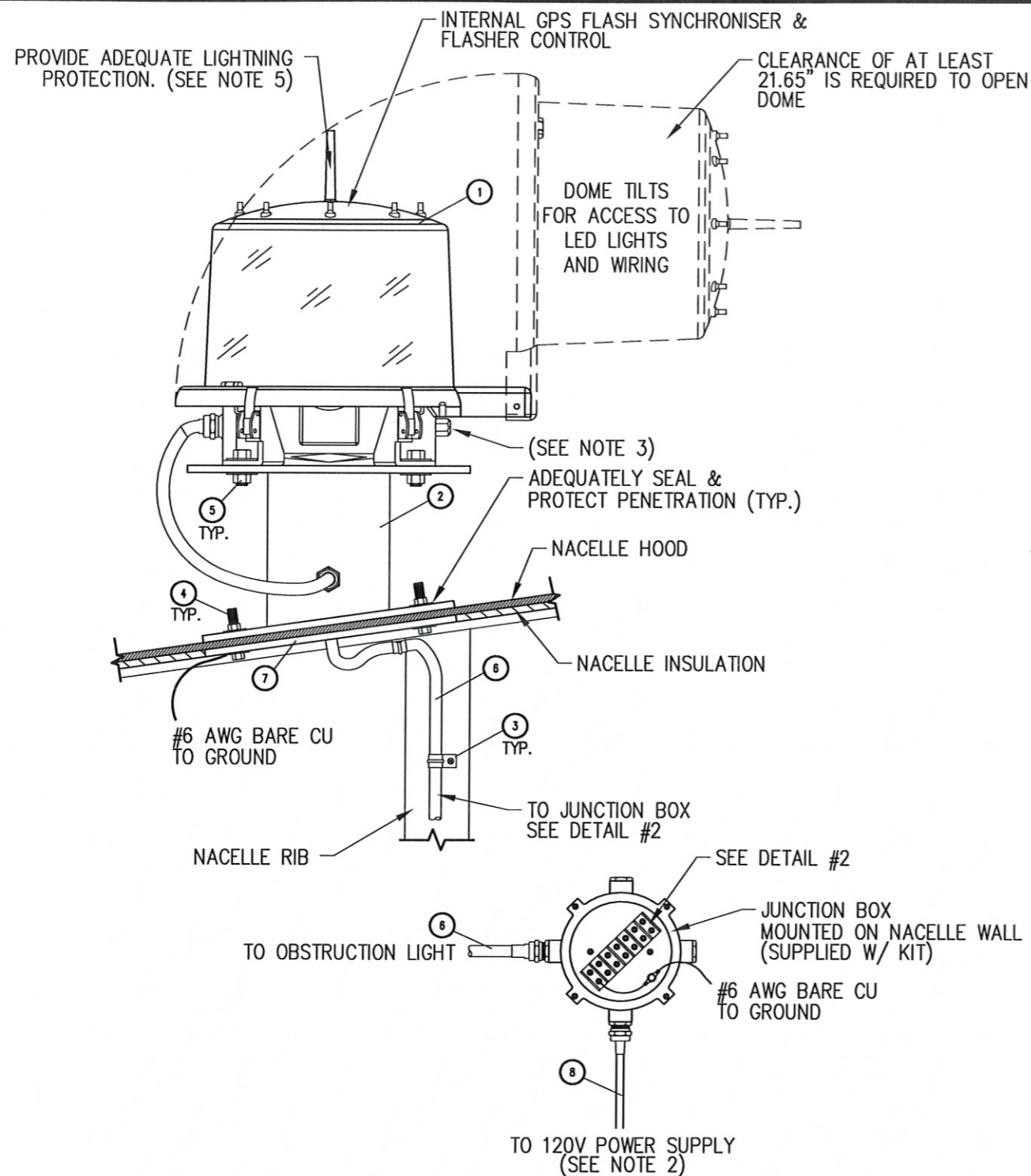


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A	ISSUE FOR INTERCONNECTION APPLICATION	9/28/10	SRF	DRM

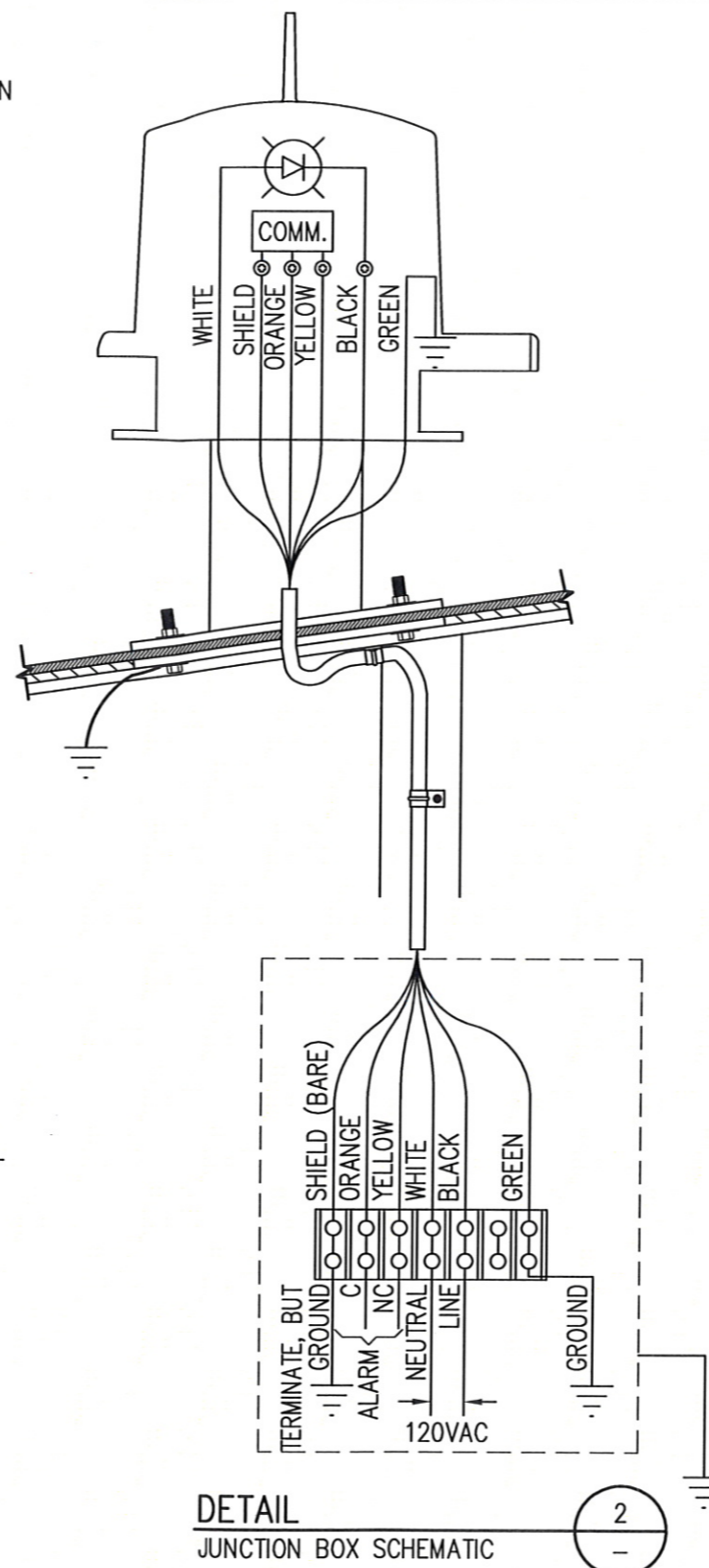


ENGINEERING RECORD		DATE
DRAWN	SRF	8/26/10
DESIGNED	BDJ	8/26/10
CHECKED	DRM	9/28/10
APPROVED	DRM	9/28/10
DWG SCALE: 1/2"=1'-0"	PLT SCALE: 1:1	

LANDUSKY WIND ENERGY PROJECT	
24.94 kV UNDERGROUND COLLECTOR SYSTEM	
500 kVA PADMOUNT TRANSFORMER FOUNDATION	
DWG. NAME: SPE-B-D006	REVISION NO: A



DETAIL 1
TOWER OBSTRUCTION LIGHTING



DETAIL 2
JUNCTION BOX SCHEMATIC

ITEM	QTY	MATERIAL DESCRIPTION
1	1	OBSTRUCTION LIGHT, FAA L-864, (Orga #L350-864-G)
2	1	OBSTRUCTION LIGHT STAND, steel, (see GE drawing #901498) or equal
3	A/R	STRAP, one hole conduit, 3/4"
4	5	BOLT, hex head, 1/2"-13 x 2 1/2", Grade 8, yellow zinc, w/ locknut and flat washer
5	4	BOLT, hex head, 5/8"-11 x 1 1/2", Grade 8, yellow zinc, w/ locknut and flat washer
6	A/R	CONDUCTOR, obstruction light, (3m Strobeline, supplied with obstruction light)
7	1	PLATE, steel, (see GE Drawing #901498) or equal
8	A/R	CONDUCTOR, unit power supply, 3/C #14 Type SO

GENERAL NOTES

1. CONFIGURATION SHOWN IS FOR DIAGRAMMATIC PURPOSES ONLY, ACTUAL INSTALLED CONFIGURATION MAY VARY, SEE CONTRACTOR/GE SPECS.
2. POWER SUPPLY ORIGINATES AT 20A AVAIL. CIRCUIT BREAKER IN CONTROL CABINET AT BASE OF TOWER, ROUTES TO NACELLE UTILIZING DOWN TOWER ASSEMBLY. SECURELY ANCHOR CABLE AS NEEDED.
3. CONTRACTOR TO INSTALL PHOTOCELL EYE TO NORTHERN POLAR SKY.
4. FAA OBSTRUCTION LIGHTS L-864 WILL BE INSTALLED ON THE WIND TURBINE GENERATOR.
5. A LIGHTNING ROD SHOULD BE MOUNTED BETWEEN 5' AND 10' AWAY FROM THE OBSTRUCTION LIGHT AND BE AT LEAST HIGH ENOUGH TO COVER THE LIGHT COMPLETELY BY AN ANGLE OF 30° PREFERRED (MAXIMUM 45°).

ALARM

NC = NORMALLY CLOSED
C = COMMON

○ = TERMINAL

* BIDDER NOTE:
FOUNDATION SHOWN IS REPRESENTATIVE ONLY. FINAL FOUNDATION DESIGN SHALL FOLLOW MTG MANUFACTURER SPECIFICATIONS.

PRELIMINARY
NOT FOR CONSTRUCTION

FILE LOCATION: L:\SPECTRUM ENG\ZORTMAN-LANDUSKY WIND\CADD\WORKING\COLLECTOR SYSTEM DRAWINGS\SPEBD007.DWG LAST SAVED BY: sfowler 9/30/2010 2:27 PM PLOTTED BY: Briquette N. Schmidt 7/28/2011 10:07 AM Tab:SPEBD007

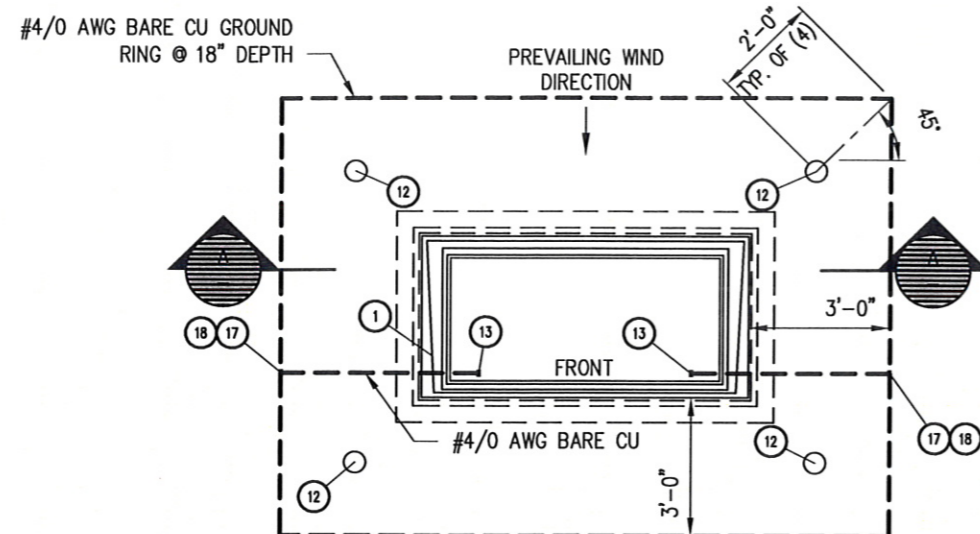


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A	ISSUE FOR INTERCONNECTION APPLICATION	9/28/10	SRF	DRM

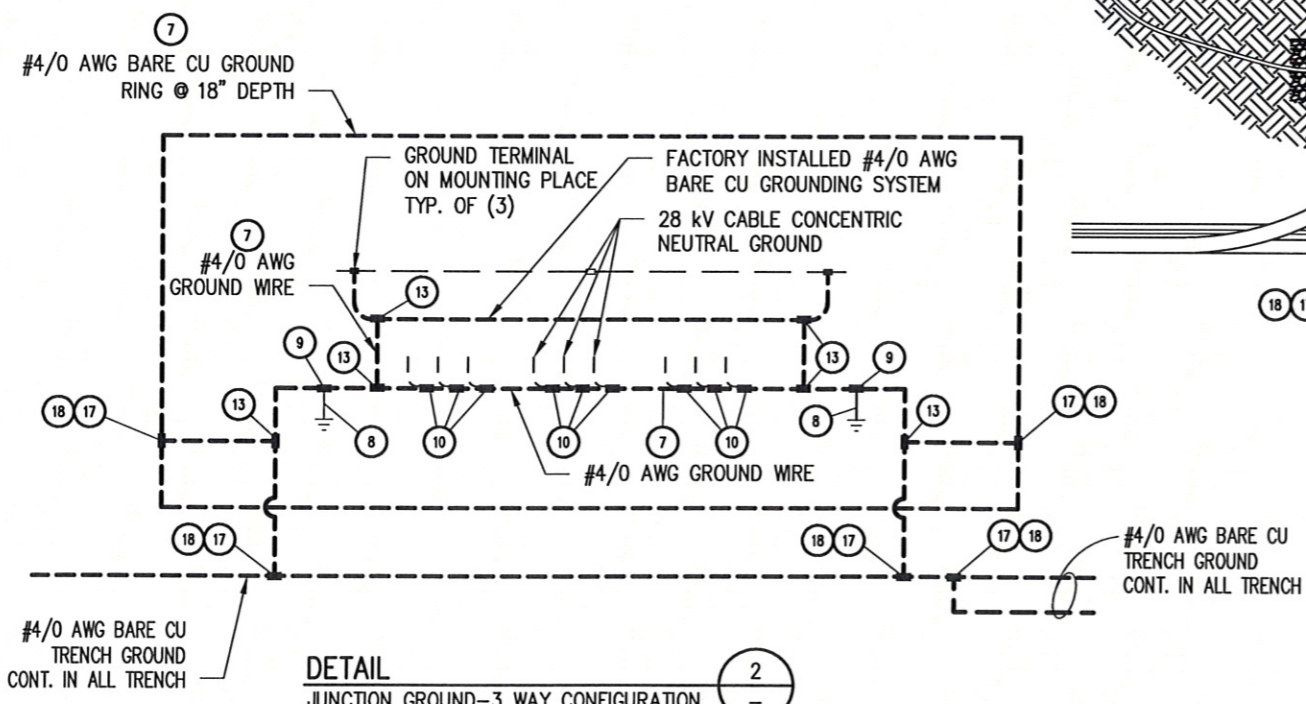


ENGINEERING RECORD		DATE
DRAWN	SRF	8/26/10
DESIGNED	BDJ	8/26/10
CHECKED	DRM	9/28/10
APPROVED	DRM	9/28/10

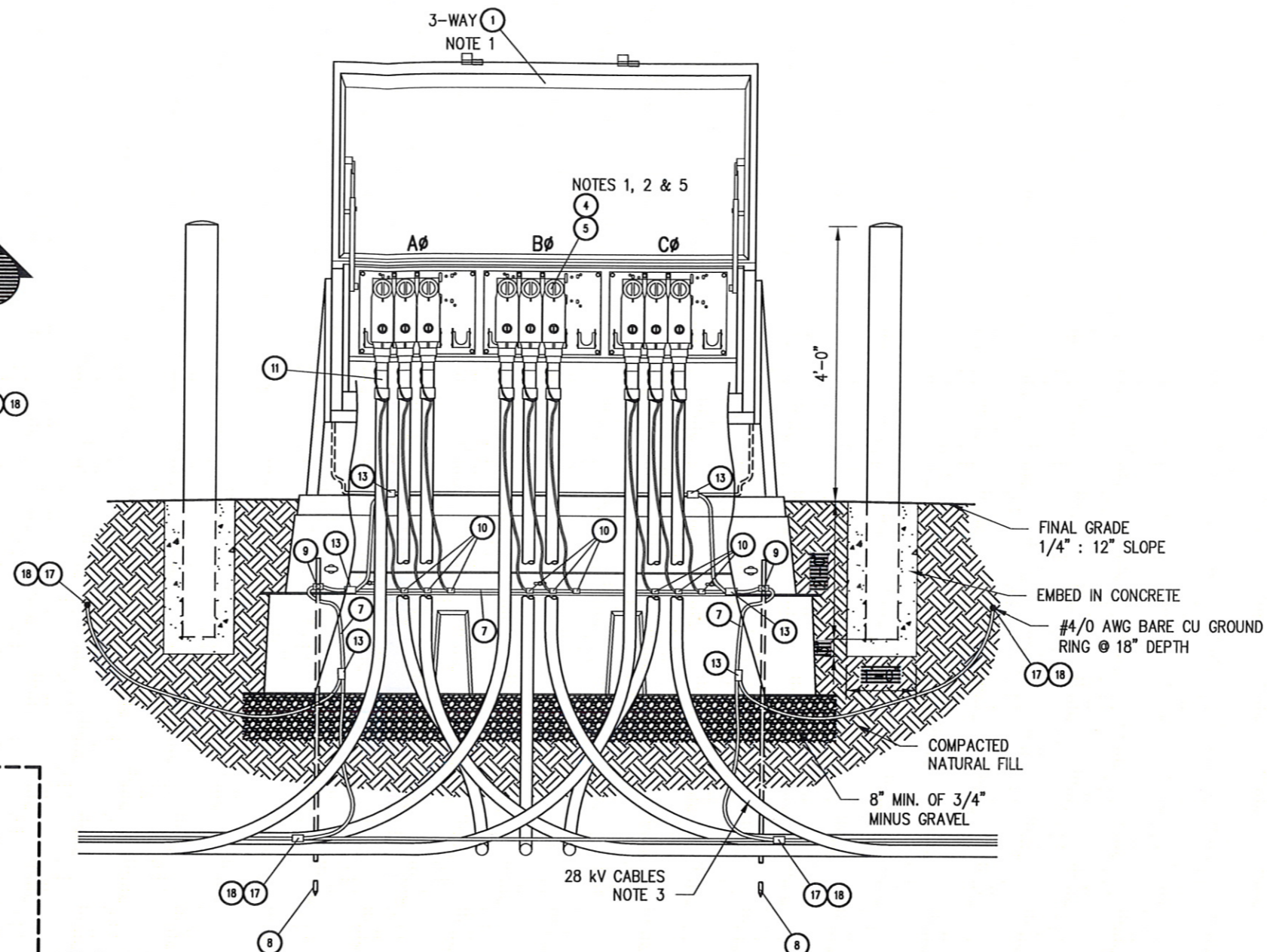
LANDUSKY WIND ENERGY PROJECT	
24.94 kV UNDERGROUND COLLECTOR SYSTEM	
TOWER OBSTRUCTION LIGHTING DETAILS	
DWG. NAME:	SPE-B-D007
REVISION NO:	A



DETAIL
GUARD POST LAYOUT



DETAIL
JUNCTION GROUND-3 WAY CONFIGURATION



SECTION
2-WAY OR 3-WAY JUNCTION

PRELIMINARY
NOT FOR CONSTRUCTION

GENERAL NOTES

- 25 kV DEAD BREAK JUNCTIONS TO BE INCLUDED WITH SECTIONALIZING CABINET FROM FACTORY.
- SEE DRAWING SPE-B-D001 FOR LOCATIONS.
- CONTRACTOR TO SUPPLY ADEQUATE SERVICE LOOP FOR SPARE CABLE AND MAINTENANCE.
- SECTIONALIZING CABINET SHALL BE ORIENTED SO DOOR IS PERPENDICULAR TO THE PREVAILING WIND DIRECTION.
- CONTRACTOR TO SUPPLY MASTIC SEALING STRIPS FOR ALL CONCENTRIC NEUTRAL TO GROUND CONNECTIONS AT DEAD BREAK ELBOWS.
- SEE DRAWING SPE-B-D008-2 FOR MATERIAL QUANTITIES AND DESCRIPTIONS.

FILE LOCATION: L:\SPECTRUM ENG\ZORTMAN-LANDUSKY WIND\CADD\WORKING\COLLECTOR SYSTEM DRAWINGS\SPEBD0081-0082.DWG LAST SAVED BY: bnban 7/28/2011 10:07 AM PLOTTED BY: Brigitte N. Schmidt 7/28/2011 10:07 AM Tab: SPEBD008-1



NO	REVISION	DATE	BY	APR
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ENGINEERING RECORD	DATE
DRAWN SRF	9/28/10
DESIGNED BDJ	9/28/10
CHECKED DRM	9/28/10
APPROVED DRM	9/28/10
DWG SCALE: NONE	PLT SCALE: 1:1

LANDUSKY WIND ENERGY PROJECT	
24.94 kV UNDERGROUND COLLECTOR SYSTEM	
SWITCHGEAR CABINET DETAILS	
DWG. NAME: SPE-B-D008-1	REVISION NO: A

SECTIONALIZING CABINET DESCRIPTION		ITEM QUANTITY										
SECTIONALIZING CABINET CONFIGURATION	SECTIONALIZING CABINET NUMBER(S)	①	②	③	④	⑤	⑥	⑩	⑪	⑬	⑬	⑬
#1/0-#1/0-#1/0	LPED2	1	0	0	0	0	9	9	9	6	0	5

ITEM	QTY	MATERIAL DESCRIPTION (UM33AF)
①	SEE TABLE	DISTRIBUTION SWITCHGEAR, w/ 18" extension, load break junctions, SS mounting plate & #4/0 AWG bare Cu ground system, 600 A, 3 Phase, 3-Way S&C Vista Switchgear or equal
②	NOT USED	ELBOW, DEAD BREAK KIT, 25 kV, 600 A, 1250 kcmil, w/ cold shrink jacket seal, Elastimold #K656LR-Q0440-S
③	NOT USED	ELBOW, DEAD BREAK KIT, 25 kV, 600 A, 1000 kcmil, w/ cold shrink jacket seal, Elastimold #K656LR-P0410-S
④	NOT USED	ELBOW, DEAD BREAK KIT, 25 kV, 600 A, 500 kcmil, w/ cold shrink jacket seal, Elastimold #K656LR-M0330-S
⑤	NOT USED	ELBOW, DEAD BREAK KIT, 25 kV, 600 A, #4/0 AWG, w/ cold shrink jacket seal, Elastimold #K656LR-L0270-S
⑥	SEE TABLE	ELBOW, DEAD BREAK KIT, 25 kV, 600 A, #1/0 AWG, w/ cold shrink jacket seal, Elastimold #K656LR-K0240-S
⑦	85'	CONDUCTOR, grounding, #4/0 AWG, Bare CU, 19 strand
⑧	2	GROUND ROD, 5/8" x 10', copperbonded, 13 mil min., 15 mil average, Cu
⑨	2	CONNECTOR, compression, #4/0 AWG to 5/8" rod, Burndy #YGL29C29
⑩	SEE TABLE	COMPRESSION CONNECTOR, "C", Conc. Neutral to #4/0 AWG, Burndy #YGHC29C26
⑪	SEE TABLE	PHASE & DESIGNATION TAGS
⑫	4	BOLLARD, 5 1/2" O.D. x 6'-0", concrete filled, painted yellow, installed in concrete
⑬	SEE TABLE	COMPRESSION CONNECTOR, 'C', #4/0 AWG to #4/0 AWG, Burndy #YGHC29C29
⑭	NOT USED	CHAIN, 3/8" steel, Grade 30 proof coil, hot dipped galvanized or equal
⑮	NOT USED	CONNECTING LINK, 3/8" steel, grade 30 or higher, hot dipped galvanized or equal
⑯	NOT USED	FAULTED CIRCUIT INDICATOR, S.T.A.R., Cooper #SMHI or equal
⑰	1	CONNECTOR MOLD, cadweld, #4/0 AWG to #4/0 AWG, Erico #TAC2Q2Q
⑱	SEE TABLE	CADWELD METAL, #150, for #4/0 AWG to #4/0 AWG

NOTE 7

NOTE 2

GENERAL NOTES

- 25 kV LOAD BREAK JUNCTIONS TO BE INCLUDED WITH DISTRIBUTION SWITCHGEAR FROM FACTORY.
- SEE DRAWING SPE-B-D001 FOR LOCATIONS.
- CONTRACTOR TO SUPPLY ADEQUATE SERVICE LOOP FOR SPARE CABLE AND MAINTENANCE.
- DISTRIBUTION SWITCHGEAR SHALL BE ORIENTED SO DOOR IS PERPENDICULAR TO THE PREVAILING WIND DIRECTION.
- CONTRACTOR TO INSTALL CHAINS BETWEEN BOLLARDS ONLY IN DESIGNATED GRAZING AREAS, OR AS REQ'D.
- CHAIN MUST BE ABLE TO BE DISCONNECTED FROM BOLLARD(S) TO PROVIDE CLEAR WORKING AREA AROUND DISTRIBUTION SWITCHGEAR.
- CONTRACTOR TO SUPPLY MASTIC SEALING STRIPS FOR ALL CONCENTRIC NEUTRAL TO GROUND CONNECTIONS AT LOAD BREAK ELBOWS.
- SEE DRAWING SPE-B-D008-1 FOR DETAILS AND ITEM LOCATIONS.

PHASE TAPE COLOR DESIGNATION

CABLES	COLOR CODE		
	Aø	Bø	Cø
28 kV CABLES	RED	BLUE	GREEN
600 V CABLES	BROWN	ORANGE	YELLOW

PRELIMINARY
NOT FOR CONSTRUCTION

FILE LOCATION: L:\SPECTRUM ENG\ZORTMAN-LANDUSKY WIND\CADD\WORKING\COLLECTOR SYSTEM DRAWINGS\SPEBD0081-0082.DWG LAST SAVED BY: bnban 7/28/2011 10:08 AM PLOTTED BY: Brigette N. Schmidt 7/28/2011 10:08 AM Tab:SPEBD008-2



A	ISSUE FOR INTERCONNECTION APPLICATION	9/28/10	SRF	DRM
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ENGINEERING RECORD		DATE
DRAWN	SRF	9/28/10
DESIGNED	BDJ	9/28/10
CHECKED	DRM	9/28/10
APPROVED	DRM	9/28/10
DWG SCALE: NONE	PLT SCALE: 1:1	

LANDUSKY WIND ENERGY PROJECT		
24.94 kV UNDERGROUND COLLECTOR SYSTEM		
SWITCHGEAR CABINET DETAILS (MATERIAL DESCRIPTION)		
DWG. NAME:	SPE-B-D008-2	REVISION NO: A